Aug. 29, 1933. M. S. CLAWSON 1,924,638

INTERMEDIATE POURING UNIT

Filed Feb. 13, 1931 2 Sheets-Sheet 1

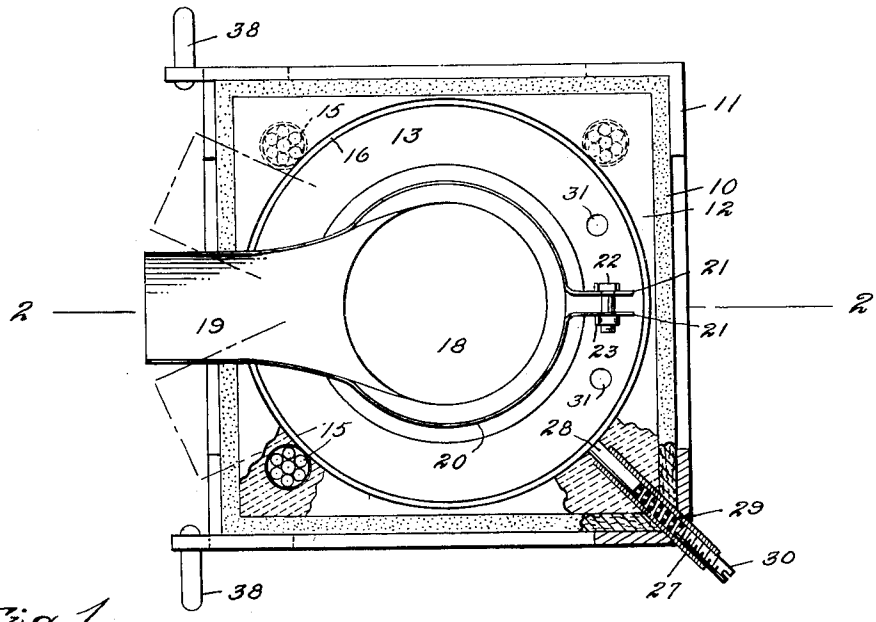


Fig. 1.

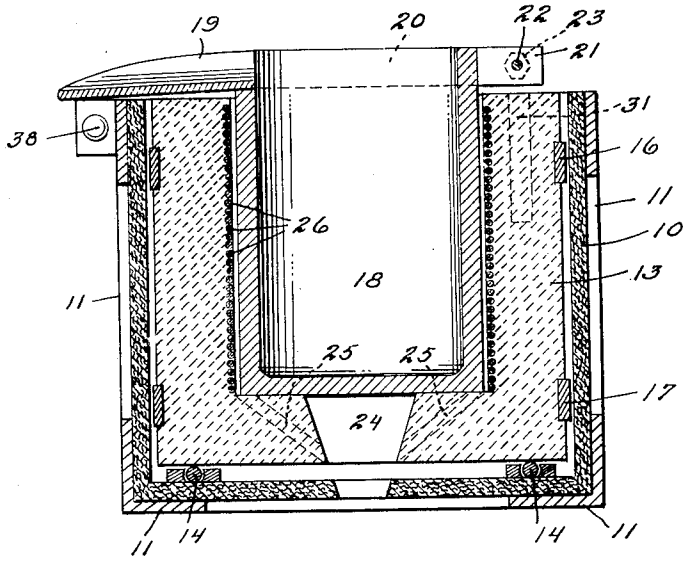


Fig. 2.

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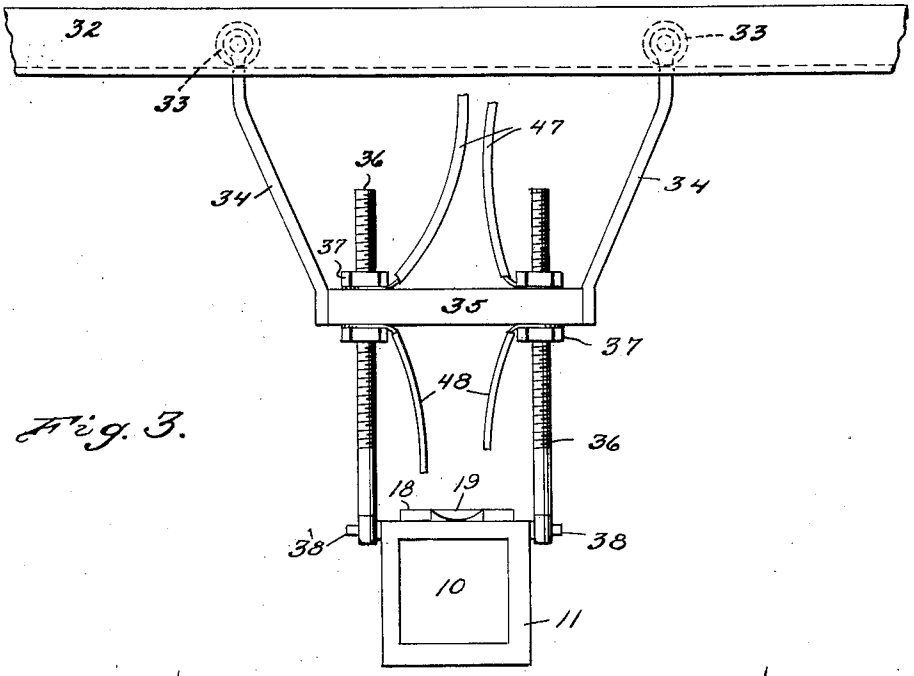


Fig. 3.

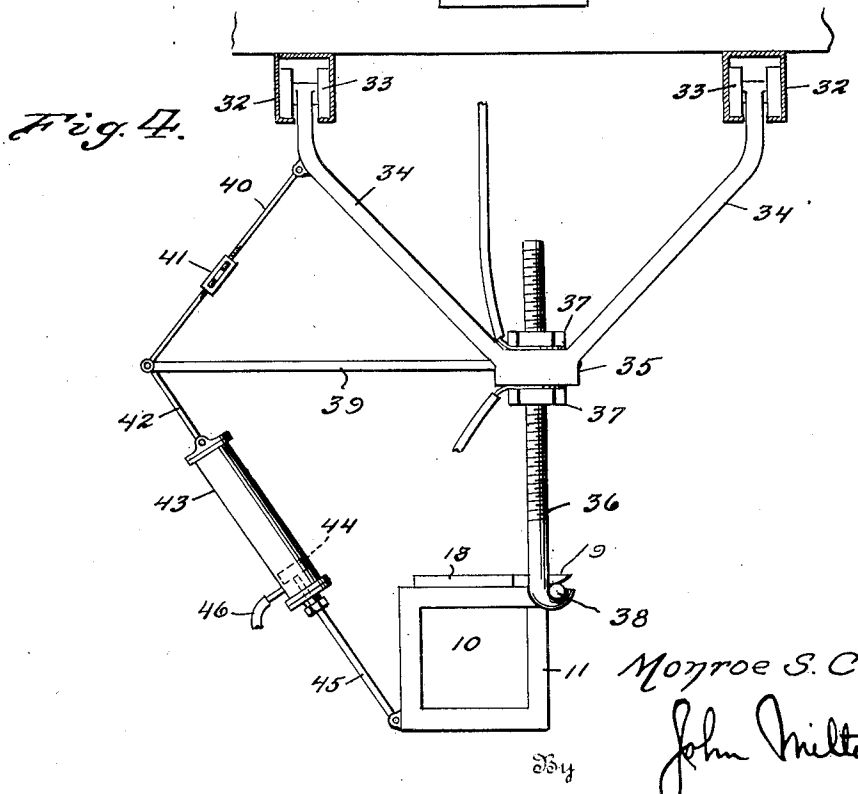


Fig. 4.

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UNITED STATES PATENT OFFICE

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INTERMEDIATE POURING UNIT

Monroe S. Clawson, Upper Montclair, N. J.

Application February 13, 1931. Serial No. 515,618

6 Claims. (Cl. 219—44)

The invention relates to metal founding, particularly to the handling and pouring of molten metals, and has for its general object the provision of a novel pouring crucible which will replace the present type of ladle used in the casting of metals.

It is well known that it is the ordinary practice to draw molten metal from a melting furnace into a comparatively small ladle which is carried by some means or method to the location where it is desired to make a casting. It is also known that if the metal be held for even a short time in the ladle or be carried a relatively short distance the temperature of the metal lowers to a sufficient extent as to impair the quality of the castings. Actually, the metal obtained at the first part of the pouring may differ materially and seriously from that at the latter part on account of the decrease in temperature resulting from holding or carrying the metal in an ordinary variety of ladle.

It is with the above facts in view that I have devised the present invention which contemplates the provision of an electrically heated crucible constituting an intermediate pouring unit which receives molten metal from a furnace and which is used for pouring it into molds, the advantage of the electric heating means being that the temperature of the molten metal is maintained at least sufficiently constant that there will be uniformity in the character of the castings produced.

A further object is to provide a device of this character in which the heated crucible is rotatably mounted so as to be capable of pouring into separate molds arranged side by side, for instance upon a carrier, the electrical connections to the heating coil being so arranged that the rotary movement will be permitted.

Another object is to provide an apparatus of this character which may be suspended from a trolley and equipped with power means for effecting tilting when casting is to be done.

An additional object is to provide an apparatus of this character which will be simple and comparatively inexpensive, easy to control, positive in action, efficient and durable in service, and a general improvement in the art.

To the attainment of the foregoing and other objects and advantages, the invention preferably consists in the detailed construction and the arrangement and combination of parts to be hereinafter more fully described and claimed, and illustrated in the accompanying drawings in which

Figure 1 is a plan view of an intermediate pouring unit constructed in accordance with my invention, parts being broken away and in section,

Figure 2 is a vertical cross section taken on the line 2—2 of Figure 1,

Figure 3 is a front elevation showing the complete apparatus arranged as a trolley, and

Figure 4 is a side elevation thereof.

Referring more particularly to the drawings, I have shown my unit as comprising an outer box-like casing 10 formed preferably of asbestos or some other equivalent heat insulating material and supported within a metallic frame 11 which is necessary to give strength and rigidity. The asbestos casing is lined with refractory material 12 formed to provide a cylindrical cavity within which is rotatably mounted a refractory crucible 13 supported upon a plurality of roller bearings 14 which rest on the bottom of the box. I also provide other roller bearing assemblies 15 which are suitably supported within the lining 12 and which bear against metallic rings 16 and 17 in the outer periphery of the refractory crucible. Naturally the sole purpose of the roller bearings is to support and guide the refractory crucible so that it may move freely and without requiring any excessive degree of effort. The metal rings have an additional purpose to be explained.

Located within the refractory crucible is a preferably standard steel crucible 18 having a pouring spout 19 reinforced by a marginal band or clamp 20 terminating at its ends in ears 21 through which passes a clamping bolt 22 equipped with a nut 23. Beneath the bottom of the steel crucible 18 the refractory crucible 12 is formed with an opening 24 to take care of any possible leakage and this opening continues on through the bottom of the outer or asbestos casing. There may be also a plurality or series of drainage passages 25 formed in the bottom of the refractory crucible and leading from the central cavity therein to the opening 24.

The intention is that the molten metal within the unit be kept at a substantially uniform temperature or at least be prevented from any undue cooling and I have therefore disclosed a resistance coil 26 located within the cavity in the refractory crucible and surrounding but slightly spaced from the steel crucible 18. To enable current to be supplied to this coil, the terminals, not shown, may be brought out and connected with the metal rings 16 and 17, respectively, which are engaged by brushes of special construction. There must, of course, be two of these, one en-

gaging the upper ring 16 and one engaging the lower ring 17, but as they are identical in construction only one is illustrated. This brush device is represented as comprising a guide tube 27 within which is a contact 28, preferably of graphite, urged by a spring 29 toward the associated ring, the tension of the spring being adjustable by a screw 30 extending into the outer end of the tube.

It will of course be understood that when the refractory crucible or pocket member 13 is made the resistance coil 26 is embedded in the inner surface and that the metal rings 16 are embedded in the outer surface. It is at this time that the opening 24 is formed. Furthermore, as this pocket member rotates within the outer casing some means must be provided to effect turning movement. The member 13 is consequently shown as having holes 31 for the reception of any convenient handle means, not shown, as being of very minor importance.

While it is conceivable that the above described device might be used or supported in different ways I prefer that it be suspended from a trolley structure and as a consequence I have illustrated in Figure 4 overhead tracks 32 mounted in any desired manner and having traveling therealong rollers or wheels 33 from which depend frame members 34 carrying a block 35 of insulating material such as fiber or the like. Precise details of the super-structure and trolley mounting are not given as they form no essential part of the invention. Extending through the insulating block 35 are spaced hooks 36 which are vertically adjustably mounted by virtue of the provision of nuts 37 engaging against the top and bottom of the block 35. The hooks 36 are for the purpose of suspending the crucible assembly which is therefore provided at opposite sides with trunnions 38.

As an added convenience it is far preferable to provide power mechanism for effecting tilting of the crucible when pouring is desired. To carry out this feature I have shown a brace arm 39 projecting from the block 35 and braced by a rod 40 within which is interposed a turn-buckle 41 for adjusting purposes. Pivotally connected with the outer end of the arm 39 is a supporting element 42 connected with one end of a cylinder 43 within which is a piston 44 carried by a piston rod 45 pivotally connected to one of the frame elements 11 on the asbestos box. Fluid pressure from any suitable source is admitted through a pipe 46 into the cylinder 43 beneath the piston 44 and when this is done it is apparent that the resulting movement of the piston will cause the crucible to be tipped.

Details of the necessary trolley structure are not shown as I deem it sufficient to illustrate conductors or cables 47 connected with the hooks 36 as by clamping them beneath the upper nuts 37, it being of course apparent that other cables 48 must be provided leading to the brushes which engage the metal rings 16 and 17 so that current may be fed to the resistance coil.

In the use of the apparatus it is clear that molten metal from a melting furnace is poured into the steel crucible 13 and that my entire assembly may then be readily shifted about from place to place where pouring is to be done, while at the same time there will be no chilling as the heat generated by the passage of electric current through the resistance coil 26 will suffice to keep the temperature substantially constant. Owing to the rotatability of the crucible within its container the spout 19 may be tilted to either side, as shown by the dotted lines in Figure 1 so that pouring into adjacent molds on a carrier or the like can be readily accomplished. The operation of tilting of the device by the fluid pressure means has already been described and need not be repeated.

From the foregoing description and a study of the drawings it will be seen that I have thus provided a simple, inexpensive and easily assembled and operated mechanism which will be highly efficient for the purpose specified and which will satisfactorily perform its functions in every respect. It is thought that the construction and advantages should be apparent to one skilled in the art without further explanation.

While I have shown and described the preferred embodiment of the invention it should be distinctly understood that the disclosure is merely illustrative of the general principles involved and that various changes and modifications may be resorted to to improve or increase the adaptability and efficiency provided such variations constitute no departure from the salient features of the invention or the scope of the claims hereunto appended.

Having thus described my invention, what I claim is:

1. An intermediate pouring unit comprising the combination of a heat insulating casing, a rotatably mounted refractory member therein having a cavity, a crucible located within said cavity, a resistance coil within the cavity surrounding the crucible for maintaining the contents of the latter at a substantially uniform temperature, a carrier connected with the casing, means on the carrier connected with the casing for tilting the same to effect pouring of the contents of the crucible.

2. An intermediate pouring unit comprising the combination of a heat insulating casing, a refractory member therein having a cavity, means supporting the refractory member for rotation within the casing, a crucible located within said cavity, a resistance coil within the cavity surrounding the crucible for maintaining the contents of the latter at a substantially uniform temperature, a carrier connected with the casing, means on the carrier connected with the casing for tilting the same to effect pouring of the contents of the crucible, contact members on the refractory member rotatable therewith connected with the ends of the coil, stationary contacts carried by the casing and engaging the first named contacts, and current carrying cables on the carrier connected with the second named contacts.

3. In an intermediate pouring unit, the combination of a heat insulating casing, a refractory member mounted therein, a crucible located within the refractory member, a current carrying resistance coil within the refractory member surrounding the crucible for heating the same, said refractory member being rotatable within the casing, and relatively movable contact members carried respectively by the refractory member and casing and connected respectively with the coil and a current source for feeding current to the coil.

4. In an intermediate pouring unit, the combination of a carrier supported casing, a refractory member mounted therein for rotary movement, bearing means within the casing supporting and guiding the refractory member, a crucible located within the refractory member, and means within

the refractory member for applying heat to the crucible and its contents, and means for tilting the casing to effect pouring, the rotatability of the refractory member with the enclosed crucible making it possible to pour at spaced points while the carrier remains stationary.

5. A pouring unit comprising a casing of heat insulating material having a cylindrical chamber therein, a refractory crucible mounted for rotation within said chamber, roller bearings located respectively in the bottom and at the sides of the chamber for supporting and guiding the refractory crucible during its movement, a metal crucible located within the refractory crucible and having a pouring spout, heating means within the refractory crucible for applying heat to the crucible and its contents, and means for tilting the casing, refractory crucible and metal crucible as an assembly to effect pouring.

6. A pouring unit comprising a casing of heat insulating material having a cylindrical chamber therein, a refractory crucible mounted for rotation within said chamber, roller bearings located respectively in the bottom and at the sides of the chamber for supporting and guiding the refractory crucible during its movement, a metal crucible located within the refractory crucible and having a pouring spout, heating means within the refractory crucible for applying heat to the crucible and its contents, and means for tilting the casing, refractory crucible and metal crucible as an assembly for effecting pouring, said heating means comprising a resistance coil, contact rings on the exterior of the refractory crucible connected with the respective ends of the coil, and contacts carried by said casing and engaging said rings.

MONROE S. CLAWSON.